

Abstract

Surgical instruments are disclosed that utilize high-pressure liquid jets to perform a variety of useful functions. In certain embodiments, surgical instruments are described incorporating one or more liquid jets utilized to contact tissue excised by a non-liquid jet tissue-cutting component of the surgical instrument for the purpose of further cutting the excised tissue and/or fragmenting and/or disaggregating at least a portion of the excised tissue into a plurality of small particles and/or facilitating or assisting removal of excised tissue from a surgical site without the need to remove the instrument from the surgical site. In certain embodiments, a liquid jet of a surgical instrument can be utilized for the purpose of excising tissue of a patient immobilized and/or manipulated by the surgical instrument. Also described are surgical devices of the type characterized by curettes, rongeurs, bone punches, bone cutting forceps, morcellators, surgical micrograspers, with functionality and performance supplemented by the integration of a liquid jet. The liquid jet, in certain embodiments of such instruments, can be used, for example, as a cutting jet and/or as a power source for a rotary tissue-contacting device, such as a drill or burr abrader. In certain embodiments, the liquid jet provided in the inventive instruments can be used to bring about or speed up the piecewise removal of tissue, for example bone or a nucleus of a spinal disc, by converting at least a portion of a segment of tissue excised with the device into smaller particles *in situ* and removing them. In operations such as those on the spine, e.g. as in the repair of herniated discs, functionality provided by liquid jets of certain of the inventive instruments can facilitate excision of tissue and removal of the excised tissue from the surgical site while requiring less/no movement of the instrument to discharge debris from the operative site, thereby improving the speed and safety of operation and decreasing fatigue and workload for the surgeon. Also disclosed are methods of using certain liquid jet-containing surgical instruments for performing surgical procedures, for example surgical procedures on the spinal column of a patient.